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## HEATING METHOD AND DEVICE FOR A WASHING AND DRYING MACHINE

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The present invention concerns a heating method and device for a washing and drying machine.

Certain types of clothes washing and drying machines contain two heating elements, one for heating the washing baths, and one for heating the drying air. Such a solution is cumbersome due to the doubling of the heating elements. Other types of washing and drying machines have a single heating element to carry out the aforementioned functions. This single heating element is provided at the bottom of the basin of the machine, but it has been noted that the drying function thereof is weak, and the development thereof is difficult due to the high temperatures produced at the bottom of the basin in the drying function.

The object of the present invention is a heating method for a washing and drying machine which allows for the cost of the machine to be reduced; to increase the reliability connected with the critical components, to the high temperature at the bottom of the basin and the control thereof; and to improve efficiency through faster heating to the desired temperature of the wet laundry.

Another object of the present invention is a washing and drying machine for the operation of this method.

The heating process in accordance with the invention is comprised of heating the laundry to be washed and/or rinsed and injecting hot air produced by the drying device of the machine in the mass of wet laundry.

The drying device of a washing and drying machine in accordance with the invention contains a single heating unit provided in the drying circuit of the machine, which is fed in energy in the washing and/or rinsing phases and the drying phase.

The invention will be better understood on reading the detailed description of an embodiment, taken as a non-limiting example and illustrated in the appended drawing, on which:

- Figure 1 is a simplified cross-sectional view of a machine in accordance with the invention, in a phase of washing laundry, and
- Figure 2 is a similar view to that of Figure 1, but in a phase of drying laundry.

The washing and drying machine (1) shown in the drawing essentially contains a body (2) enclosing a tank (3), inside of which a drum (4) turns. A drying circuit (5) (heating and air propulsion) has its air inlet (6) connected to the upper part of the tank (3), above the water level of the tank, and its outlet tube (4) is connected to the drum (4). Preferably, the extremity of the tube (7) is coaxial to the axis of the drum (4). In a variant, the extremity of the tube (7) can be open at the bottom of the tank (3). The drying circuit (5) contains, in a known manner, a ventilator (8) and a unit (9) for heating air. The other elements of the machine that are not useful in comprehending the invention

(motors, timer, heat sensor, condenser, temperature-regulating circuit, etc.) have not been shown in the drawing. A load of laundry (10) has been provided in the drum (4).

As shown in Figure 1, an appropriate quantity of washing water (11) is admitted into the tank (3). Generally, the water level is clearly below the axis of the drum (4), which results in the fact that a single part of the load of laundry (10) is soaked in this water, with the rest of the laundry being only wet.

The hot air blown into the drum (4) by the tube (7) is thus directly in contact with the wet laundry, which means that the washing water is mainly heated indirectly by the laundry. Of course, it is advantageous not to blow in the air until the laundry is completely wet. It is also a matter of course that the heating may be operated in the rinsing phase.

As shown in Figure 2, in the drying phase, the water in the tank is evacuated, and the hot air is transmitted by the circuit (5) in the same manner as in Figure 1; i.e. towards the axis of the drum (4).

Of course, during the course of the different washing, rinsing, and drying phases, the temperature of the hot air transmitted by the circuit (5) is regulated to a value that is suitable to each of the phases.

Thus, thanks to the invention, a heating element with its temperature sensor and associated circuits can be omitted, which allows for the cost of the machine to be reduced. Furthermore, the reliability of the machine is improved by the omission of these elements, and the performance of the machine in washing, and eventually in rinsing, is improved due to the fact that the temperature of the wet laundry, directly heated by hot air, increases more quickly than when the washing water is directly heated.

In a preferable manner, the power of the heating element (10) can be increased compared to a conventional drying element, in order to reduce the heating time during the washing phase.

Also, in a preferable manner, the dead volume at the bottom of the tank can be omitted, as there is no longer a need to provide supplementary volume housing the heating element of the washing water. The volume of water necessary for washing, and thus the heating energy, are diminished in this manner.

In accordance with a variant of the invention, the circuit (5) may inject water vapor or hot water in addition to hot air (for example, alternatively). For this, the washing or rinsing water sent to the drying circuit is caused to recirculate, upstream from the heating element (9) (recirculation circuit [12] shown by the dotted line in Figure 1).

#### Claims

1. Heating method for a washing and drying machine, characterized in that it is comprised of heating the laundry to be washed and/or rinsed by injecting hot air produced by the drying device of the machine into the mass of wet laundry.
2. Process according to Claim 1, characterized in that, in the washing and/or rinsing phase, water vapor or hot water is injected in addition to hot air.
3. Heating device for a washing and drying machine, characterized in that it is comprised of a single heating unit (9) provided in the drying circuit (5) of the machine, the heating unit being fed energy in the washing and/or rinsing phases, and in that the air inlet (6) of the single heating unit is provided above the water level of the tank in order to reheat the washing water by hot air during the washing period and, when such is the case, the rinsing period.

4. Device in accordance with Claim 3 characterized in that the drying circuit opens (7) into the axis of the drum (4) of the machine.
5. Device in accordance with Claim 3 or 4, characterized in that a water recirculation circuit (12) is connected with the drying circuit upstream of the heating unit.

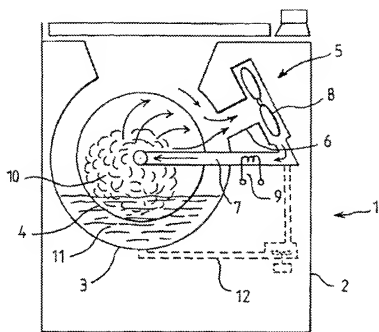


FIG. 1

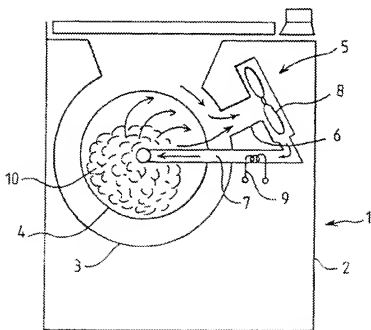


FIG. 2

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